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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,596	10/31/2003	Nicolas B. Cobb	MEGC121796	1652
26389	7590	06/20/2005	EXAMINER	
CHRISTENSEN, O'CONNOR, JOHNSON, KINDNESS, PLLC			SIEK, VUTHE	
1420 FIFTH AVENUE			ART UNIT	
SUITE 2800			PAPER NUMBER	
SEATTLE, WA 98101-2347			2825	

DATE MAILED: 06/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/698,596	COBB ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Vuthe Siek	2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 October 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3,11-13,16 and 17 is/are rejected.
- 7) ☒ Claim(s) 2,4-10,14 and 15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>3/15/04</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

### **DETAILED ACTION**

1. This office action is in response to application 10/698,596 filed on 10/31/2003.

Claims 1-17 remain pending in the application.

#### ***Drawings***

2. The drawings in this application are objected to by the Draftsperson as informal. Any drawing corrections requested, but not made in the prior application should be repeated in this application if such changes are still desired. If the drawings were changed and approved during the prosecution of the prior application, a petition may be filed under 37 CFR 1.182 requesting the transfer of such drawings, provided the parent application has been abandoned. However, a copy of the drawings as originally filed must be included in the 37 CFR 1.60 application papers to indicate the original content.

#### ***Claim Objections***

3. Claim 11 is objected to because of the following informalities: in step "defining...", phrase "should be", should be changed to --is-- in order to provide more accurate claimed language; step "identifying..." should be amended to improved and better defined claimed language since there no metes and bounds "where it is likely to be difficult to obtain a minimum edge position error". Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Cobb et al.

"Model-based OPC using the MEFS Matrix," Proceedings of SPIE, Vol. 4889: 22<sup>nd</sup>

Annual BACUS Symposium on Photomask Technology, Monterey, Calif., Sept. 30-Oct. 4, 2002, pp. 1-17.

6. As to claims 1, 3, 11-14 and 16-17 (any claims as rejected), Cobb et al. teach a method of preparing a file that defines one or more objects to be created photolithographically for correction with an optical and process control (OPC) tool, comprising receiving the file being defined as polygon in the file (performing OPC edge movements of all edges which affect the edge placement error (EPE) at each simulation site, where the EPE is monitored by simulation along all sites (control sites). The EPE is controllable for each site by moving the position of its edge fragment. The primary goal is to minimize edge placement error by modifying mask edges. Therefore, a model is used to related edge movements to edge placement error. Cobb et al. teach full matrix calculation by constructing matrix M by perturbing each fragment and observing the effect of the perturbation on the EPE at each site (control site). The image intensity I is computed by summing the squared individual field values  $f_i$ . And the important thing is that field values are computed by linear convolution of a kernel (sometimes called a filter, "Gaussian filter"), with the mask (applying a smoothing filter to one or more fragment polygon). The above teachings would suggest that method must include calculating an error for the control site in the one or more fragmented polygons that is used to adjust the position and/or orientation of the control sites or eliminate control

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from a polygon prior to applying the OPC tool to the polygons in order to minimize the objective function (EPE). It should be noted the file of objects being defined as polygons must be used in order to OPC.

7. Claims 1, 3, 11-14 and 16-17 are rejected under 35 U.S.C. 102(a) as being anticipated by Cobb et al., "Using OPC to Optimize for Image Slope and Improve Process Window," (Nov. 20, 2002), Proceedings of SPIE, Vol. 5130: Photomask Japan, Yokohama, Japan, April 16-18, pp. 1-7.

8. As to claims 1, 3, 11-14 and 16-17, Cobb et al. teach using gradient of the image slope and gradient of edge placement error (EPE) in order to improve both slope and EPE during OPC. The EPE gradient taken with respect to edge position. Cobb et al. broaden the scope of OPC to maximize slope for improved image robustness and to maximize process window. The full image optimization is described in paragraph 3, including fragmenting each polygon into edge segments, defining a control site, applying a smoothing filter, calculating the EPE (error for the control sites in the one or more fragmented polygons) to adjust the position and/or orientation of the control sites or eliminate control sites from a polygon prior to applying the OPC tool to the polygon. The application of filter is shown in Fig. 1.

***Allowable Subject Matter***

9. Claims 2, 4-10 and 14-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vuthe Siek whose telephone number is (571) 272-1906. The examiner can normally be reached on Increase Flextime.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Vuthe Siek

  
**VUTHE SIEK**  
**PRIMARY EXAMINER**